

An aerial photograph of a large body of water, likely a lake or reservoir, surrounded by dense green forested land. Several small islands and peninsulas are visible, some with rocky shorelines. A long wooden pier or dock extends into the water from one of the islands. The water is a deep blue color.

Navigation Systems

Objectives

1. To have a basic knowledge of the definitions for various Aids to Navigation
2. To understand why aids are established
3. To understand the specific purpose of various Aids to Navigation
4. To understand the ICW, Western Rivers, & Lateral Marking Systems, and the Conventional Direction of Buoyage
5. To Become familiar with the flash characteristics used on Aids to Navigation

Authority

General Authority -

The Coast Guard has the authority to, develop, administer, and operate short range aids to navigation systems to serve the needs of maritime commerce and the armed forces.

Statutory Authority-

The Coast Guard shall develop, maintain, establish and operate, with due regard for the requirements of national defense, aids to maritime navigation for the promotion of safety on and over the high seas and waters subject to the jurisdiction of the United States.

(14 USC 2)

**COMDTINST 16500.7 (Aids to Navigation
Admin. Manual)**

Definitions

- Aid to Navigation:
 - **Any device external to a vessel** or aircraft intended to assist a navigator to determine position, safe course, or to warn of dangers or obstructions to navigation.
- Buoy:
 - An unmanned, floating aid to navigation moored to the **seabed**. They may be lighted or unlighted.

Definitions

- Beacon:
 - Any **fixed** aid to navigation located on shore or marine sites. Lighted beacons are called lights, unlighted beacons are called day beacons.
- Range:
 - Pairs of beacons arranged so that when they are lined up they indicate the center of the **channel**.

Definitions

- Daymark:
 - The daytime identifier of an aid to navigation presenting one of several colors, shapes, numerals or letters.
 1. Square, triangle, rectangle, diamond or octagon
 2. Top marks on buoys, and the buoys shape

Definitions

- IALA:
 - International Association of Lighthouse Authorities.
 - Divides world into 2 regions
 - Region “A”: Most of the World
 - Region “B”: North & South America, Japan, Korea, and the Philippines

Definitions

- Region “A”
 - Green Even Triangles
 - Red Odd Squares
- Region “B”
 - Red Even Triangles
 - Green Odd Squares

Introduction

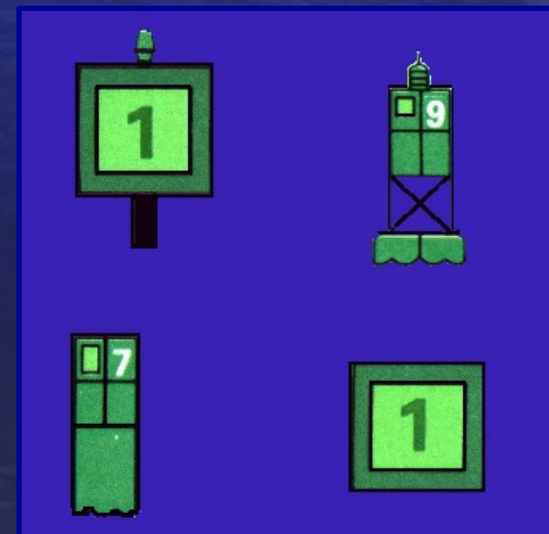
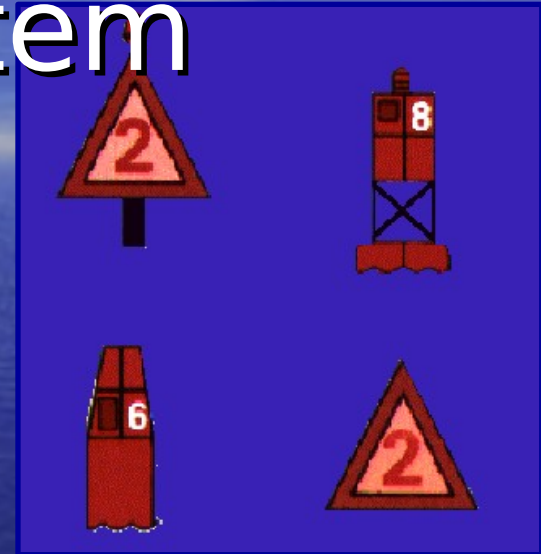
- U.S. Aids to Navigation System
 - U.S. Marking System
 - Intracoastal Waterway (ICW) Marking System
 - Western Rivers Marking System

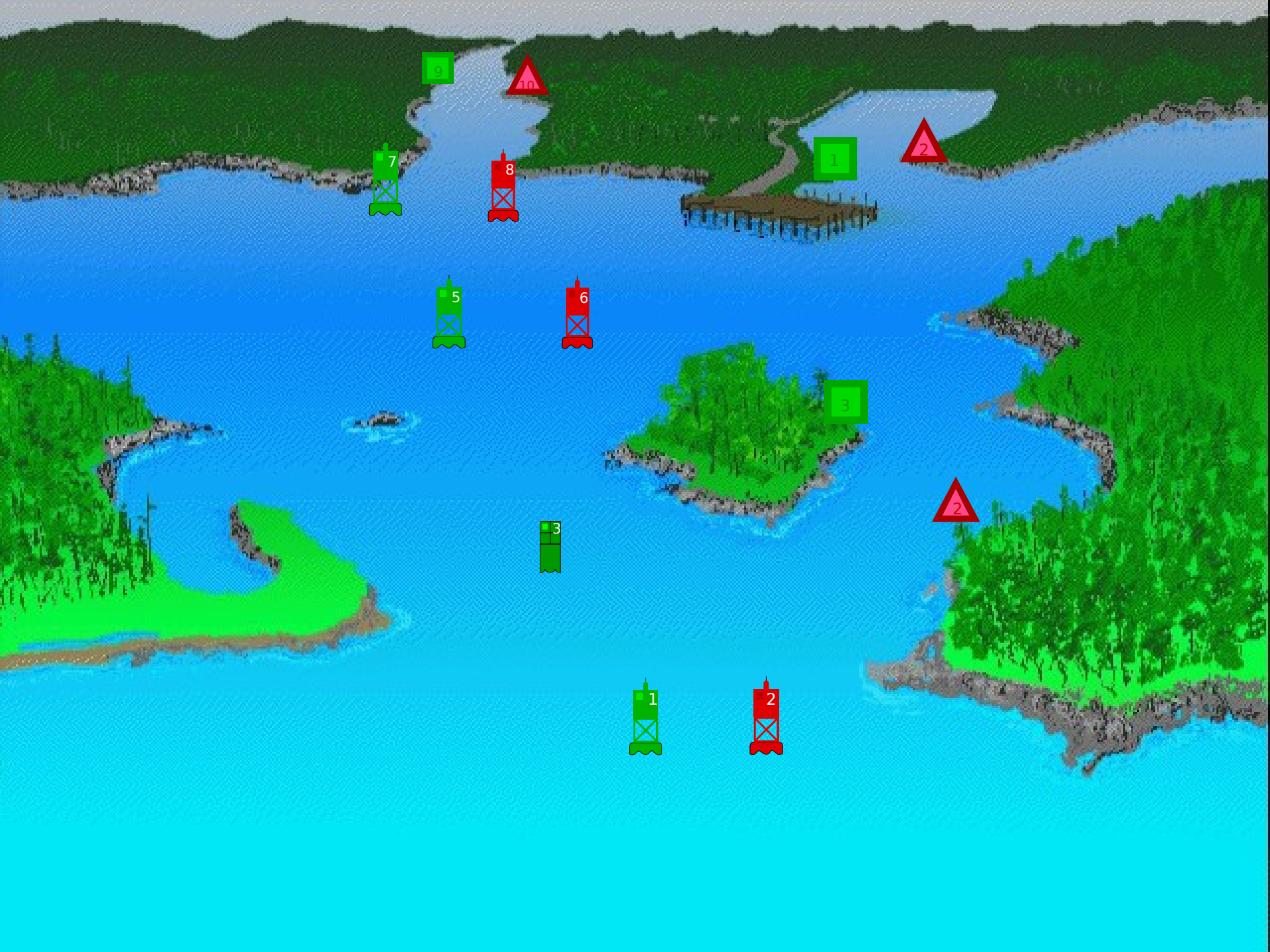
U. S. Marking System

- Predominantly Lateral System:
 - Employs a simple arrangement of colors, shapes, numbers and light characteristics to mark the limits of navigable routes.
- 3-R's
 - **Red Right Returning** from sea

U. S. Marking System

- Starboard Lateral Marks
 - Color: **Red**
 - Shape: **Triangles and Nuns**
 - Character: **Even Numbers**
 - Light: **Red**
- Port Lateral Marks
 - Color: **Green**
 - Shape: **Squares and Cans**
 - Character: **Odd Numbers**
 - Light: **Green**





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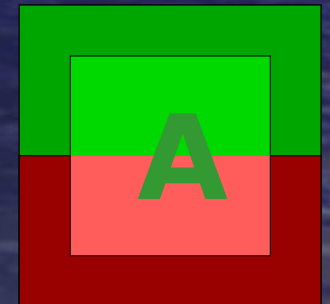
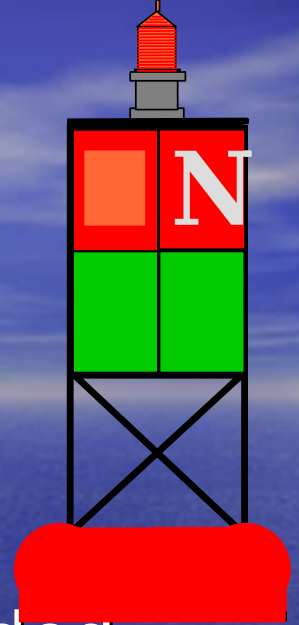


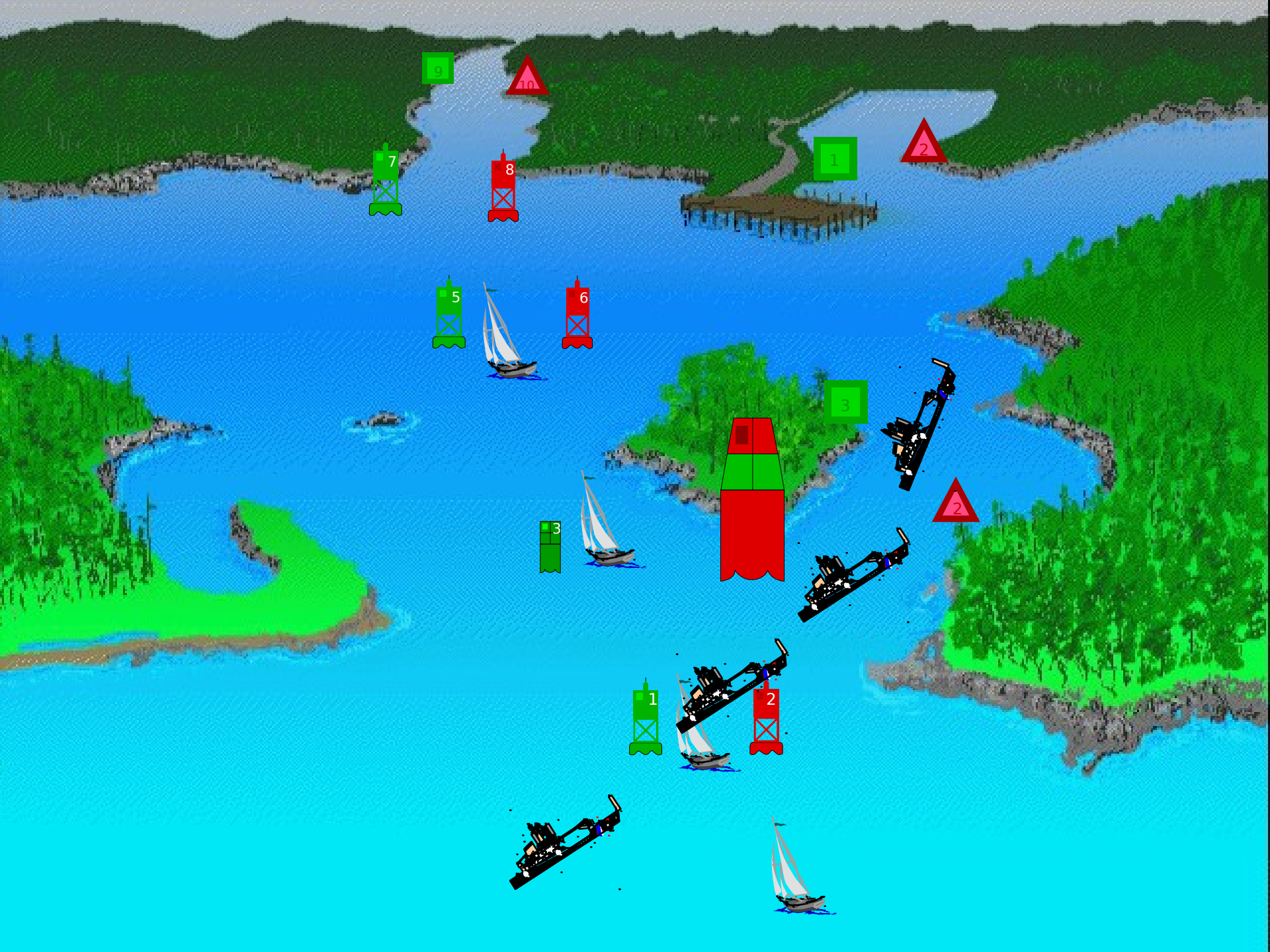
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U. S. Marking System

- Preferred Channel Marks
- Purpose: Marks **junctions** and **bifurcation's**
- Description:
 - Color: **Red** & **Green** horizontally banded (uppermost band is preferred channel)
 - Shape: Same as preferred channel
 - Character: dayboard - topmost color for letter
buoy - letter (white)
 - Light: Same as uppermost band
 - Characteristic: **Fl (2+1) 6s**





U. S. Marking System

- Safe Water Marks
- Purpose: Indicates navigable water all around the mark (i.e. mid-channel, fairway, sea buoy)
- Description:
 - Color: **Red** and White vertically striped
 - Shape: Sphere or Buoy with Topmark
 - Character: Letters (white) (ex. “GB” Galveston Bay)
 - Light: White
 - Characteristic: Mo(A)



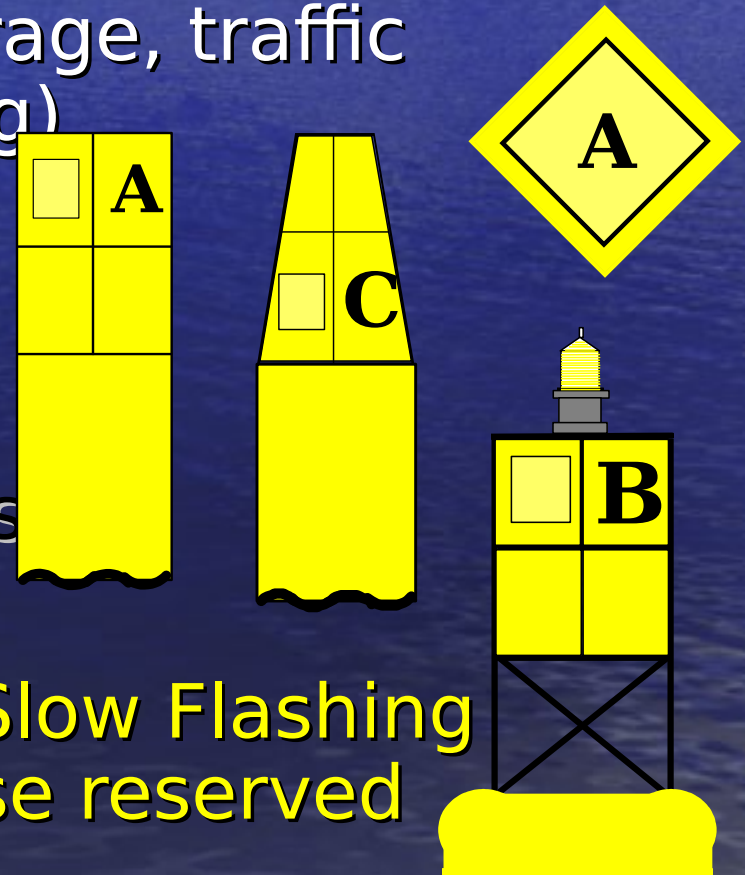
U. S. Marking System

- Isolated Danger Marks
- Purpose: Marks isolated danger which may be passed on all sides (no lateral significance)
- Description:
 - Color: **Black** and **Red** horizontally banded
 - Shape: Buoy with Topmark
 - Character: Letters (white)
 - Light: White
 - Characteristic: Gp Fl (2) 5s
 - Topmark: 2 Black Balls



U. S. Marking System

- Special Purpose Aids
- Purpose: Not intended to assist safe navigation but to indicate special areas marked on charts (anchorage, traffic separation, data gathering)
- Description:
 - Color: **Yellow**
 - Shape: Various
 - Character: Black letters
 - Light: **Yellow**
 - Characteristic: **Any Slow Flashing Rhythm, not otherwise reserved**



U. S. Marking System

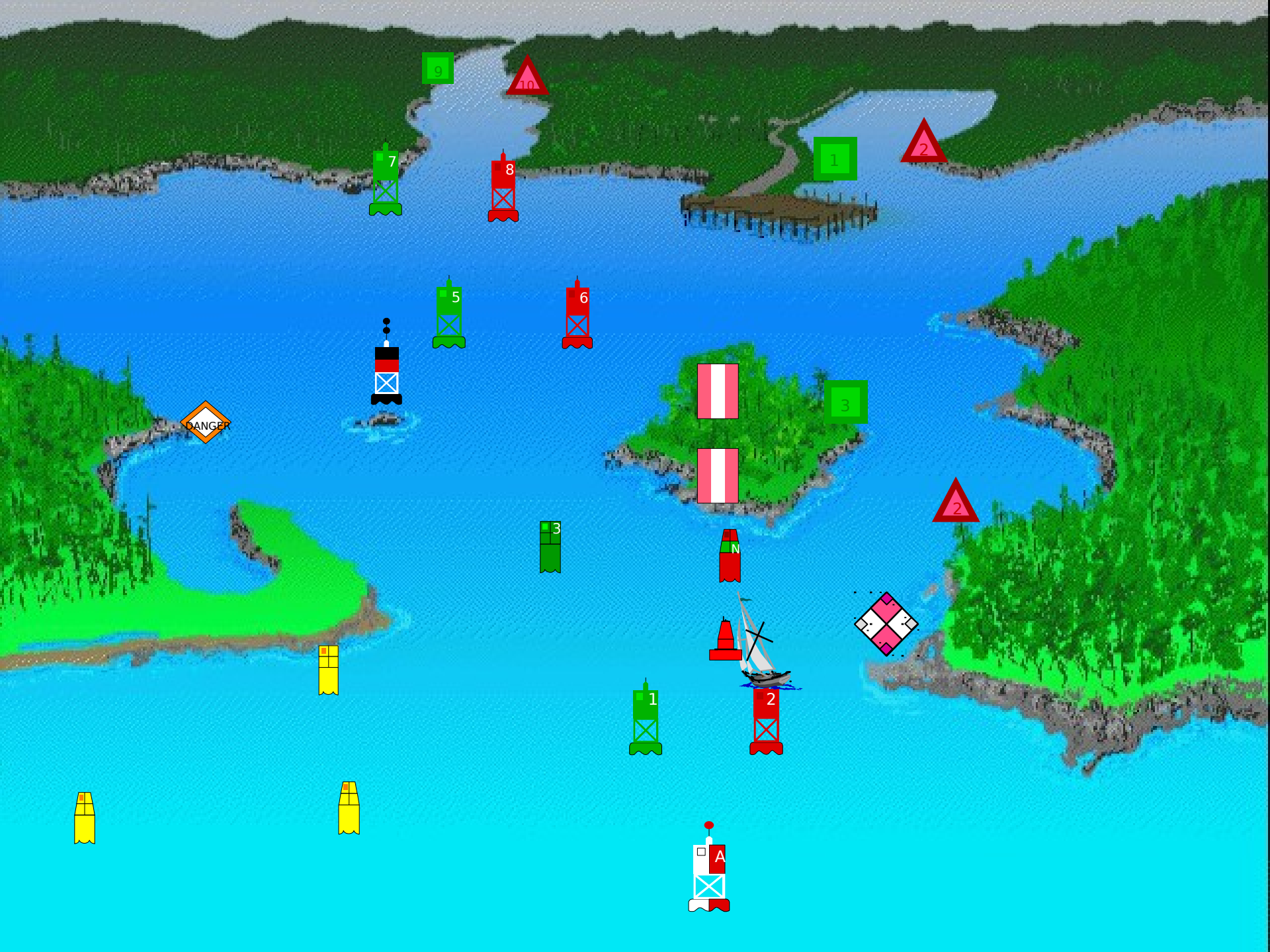
- Information and Regulatory Marks
- Purpose: Alert the mariner to such things as submerged pipes, no wake zones, etc.
- Description:
 - Color: White; orange band or border (retro)
 - Shapes: Square, Circle or Diamond
 - Character: Black Letters (usually words)
 - Light: White
 - Characteristic: Any Rhythm, not reserved



U. S. Marking System

- Wreck Markers
- Purpose: To alert the mariner to wrecks
- Description:
 - Color: Appropriate to side of channel
 - Shape: Appropriate to side of channel
 - Character: White Letters “WR” numbered in sequence with channel (i.e. WR12)
 - Light: Same as buoy color
 - Characteristic: Q (lateral mark) or Fl (2+1) 6s (preferred channel mark)

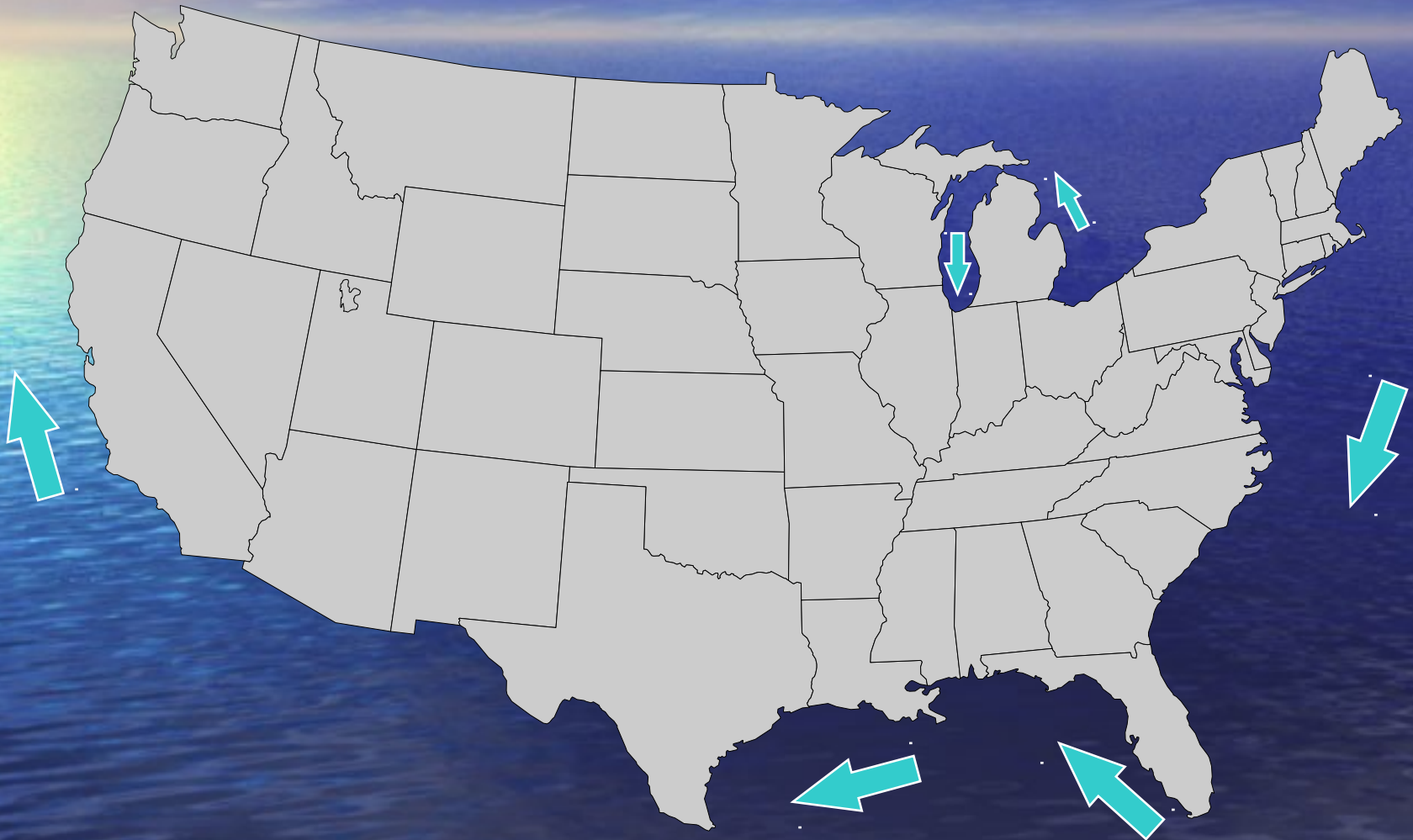




U. S. Marking System

- Conventional Direction of Buoyage
- Purpose: To identify how aids should be passed in areas other than channels.
- Regions:
 - Atlantic Coast: Southerly
 - Gulf Coast: North and Westerly
 - Pacific Coast: Northerly
 - Great Lakes: North and Westerly
(Lake Michigan: Southerly)

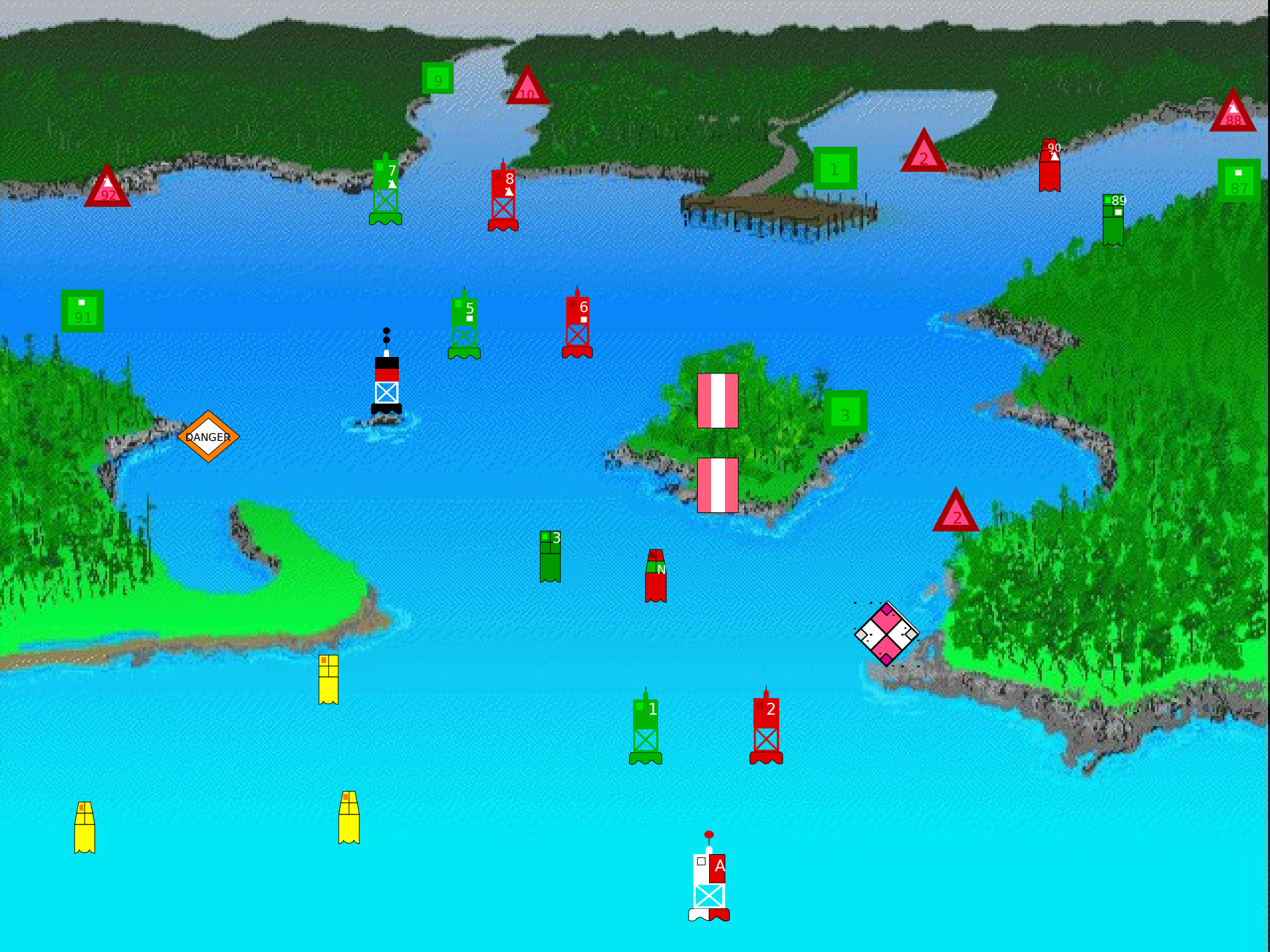
Conventional Direction of Buoyage



Intracoastal Waterway Marking System

- Runs from **Manasquan NJ** to **Brownsville TX** Differs only from U.S. marking system in that ICW aids show distinctive identifying symbols
- Conventional Direction of Buoyage is the same as the East and Gulf Coasts
- Identifying Marks
 - Starboard Marks: **Yellow Triangle**
 - Port Marks: **Yellow Square**
 - Non-lateral ICW Mark: **2" Yellow Strip on bottom**



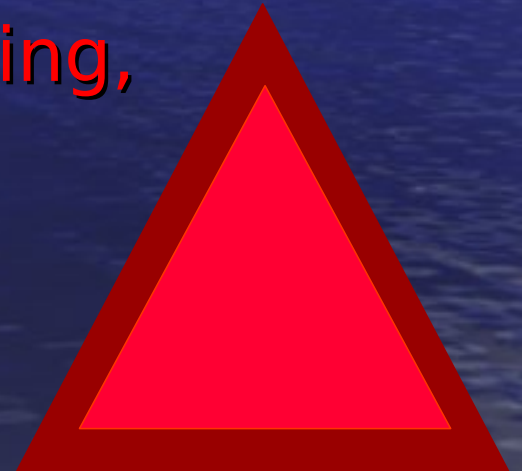


Western Rivers Marking System

- The Mississippi River and its tributaries
- Western Rivers differ from the U.S. Marking system as follows:
 1. The conventional direction of buoyage is from the mouth to head of navigation. Local terminology describes aids as **Right** or **Left** descending bank (RDB or LDB)
 2. Aids are not numbered or lettered
 3. Safe water & Isolated danger marks are not used

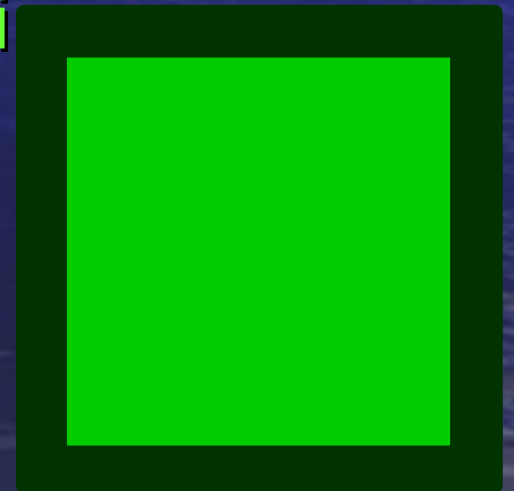
Western River System

- Left Descending Bank Marks:
 - Color: **Red**
 - Shape: **Triangle**
 - Light: **Red**
 - Characteristic: **Group flashing,**
i.e. FL (2) 5s, FL (2) 6s



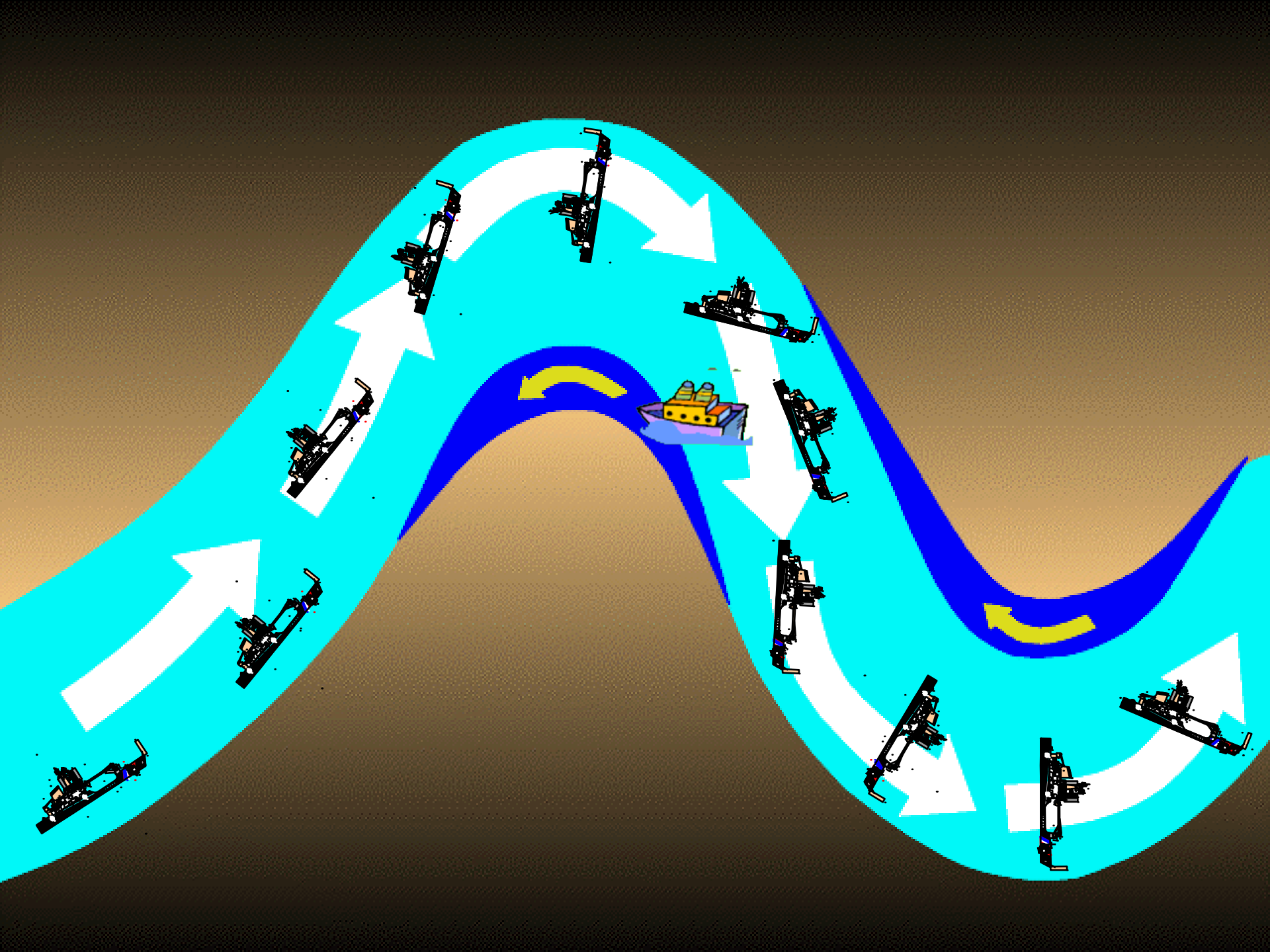
Western River System

- Right Descending Bank Marks:
 - Color: Green
 - Shape: Square
 - Light: Green
 - Characteristic: Single Flashing
i.e. Fl 4s, or Fl 6s



Western River System

- Crossing Marks:
 - Show where traffic is to move from one side of the bank to the other.
Upbound takes the points,
Downbound takes the bends.



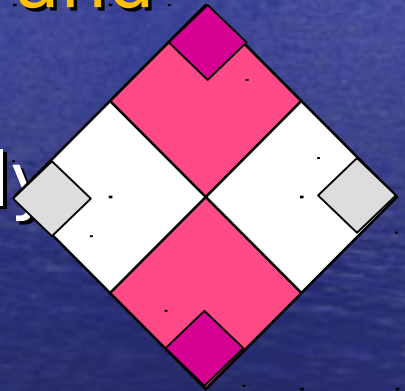
Western River System

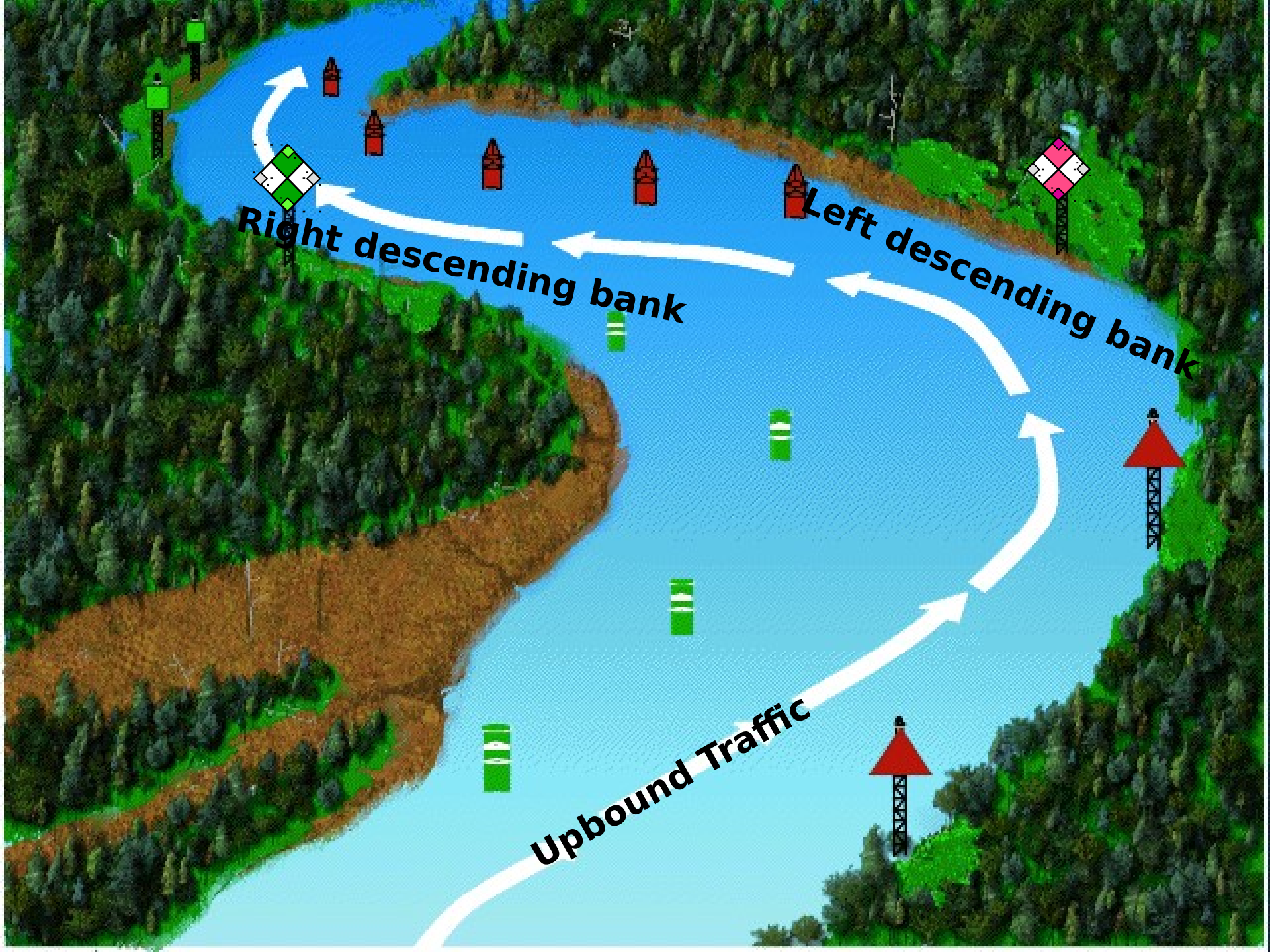
- Crossing Marks:

- Color: Red-and-White or Green-and-White

(Solid red or green phased out July 2001)

- Shape: Diamond
- Light & Characteristic: Same as LDB/RDB marks (White lights being phased out)





Right descending bank

Left descending bank

Upbound Traffic



REVIEW

Review

- Primary Navigation Marking systems
 - U.S., Intracoastal Waterway, Western River
- US Marking system (Lateral)
 - Port, Starboard, Preferred Channel, Safe water, Isolated Danger, Special Purpose, Information and Regulatory, and Wreck Markers
- Intracoastal Waterway Marks
 - Starboard Mark- Yellow Triangle
 - Port Mark- Yellow Square
 - Non-Lateral - 2" Yellow Strip

Review

- Differences between Western Rivers and U.S. Marking systems
 - Aids are not numbered or lettered
 - Safe Water marks and Isolated Danger marks are not used
- Difference between Intracoastal and U.S. Marking systems
 - ICW identifiers are used

